

To: Schumacher, Brian[Schumacher.Brian@epa.gov]; Shoemaker, Jody[jshoemaker.jody@epa.gov]

From: Sayles, Gregory

Sent: Fri 1/31/2014 11:53:26 PM

Subject: Fw: Rescheduled: Conference Call -- PPh Discussion Group
(Feb 3 09:30 AM EST)

Ex. 6 - Personal Privacy

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Conference call Info:

Dial In #

Meeting ID

Ex. 6 - Personal Privacy

Suggested Agenda:

Current Detection Limits

PPh & DiPPh analysis results to date

Health Based Standard(s) for PPh & DiPPh

Formaldehyde (see the blog below that was posted yesterday on this issue)

January 30, 2014

The West Virginia Formaldehyde Claim Is Nonsense

Posted by Derek

This morning I heard reports of formaldehyde being found in Charleston, West Virginia water samples as a result of the recent chemical spill there. My first thought, as a chemist, was "You know, that doesn't make any sense". A closer look confirmed that view, and led me to even more dubious things about this news story. Read on - there's some chemistry for a few paragraphs, and then near the end we get to the eyebrow-raising stuff.

The compound that spilled was (4-methylcyclohexane)methanol, abbreviated as 4-MCHM. That's its structure over there.

For the nonchemists in the audience, here's a chance to show how chemical nomenclature works. Those lines represent bonds between atoms, and if the atom isn't labeled with its own letter, it's a carbon (this compound has one one labeled atom, that O for oxygen). These sorts of carbons take four bonds each, and that means that there are a number of hydrogens bonded to them that aren't shown. You'd add one, two, or three hydrogens as needed to each to take each one up to four bonds.

The six-membered ring in the middle is "cyclohexane" in organic chemistry lingo. You'll note two things coming off it, at opposite ends of the ring. The small branch is a methyl group (one carbon), and the other one is a methyl group substituted with an alcohol (OH). The one-carbon alcohol compound (CH₃OH) is methanol, and the rules of chemical naming say that the "methanol-like" part of this structure takes priority, so it's named as a methanol molecule with a ring stuck to its carbon. And that ring has another methyl group, which means that its position needs to be specified. The ring carbon that has the "methanol" gets numbered as #1 (priority again), so the one with the methyl group, counting over, is #4. So this compound's full name is (4-methylcyclohexane)methanol.

I went into that naming detail because it turns out to be important. This spill, needless to say, was a terrible thing that never should have happened. Dumping a huge load of industrial solvent into a river is a crime in both the legal and moral senses of the word. Early indications are that negligence had a role in the accident, which I can easily believe, and if so, I hope that those responsible are prosecuted, both for justice to be served and as a warning to

others. Handling industrial chemicals involves a great deal of responsibility, and as a working chemist it pisses me off to see people doing it so poorly. But this accident, like any news story involving any sort of chemistry, also manages to show how little anyone outside the field understands anything about chemicals at all. I say that because among the many lawsuits being filed, there are some that show (thanks, Chemjobber!) that the lawyers appear to believe that the chemical spill was a mixture of 4-methylcyclohexane and methanol. Not so. This is a misreading of the name, a mistake that a non-chemist might make because the rest of the English language doesn't usually build up nouns the way organic chemistry does. Chemical nomenclature is way too logical and cut-and-dried to be anything like a natural language; you really can draw a complex compound's structure just by reading its name closely enough. This error is a little like deciding that a hairdryer must be a device made partly out of hair.

I'm not exaggerating. The court filing, by the law firm of Thompson and Barney, says explicitly:

30. The combination chemical 4-MCHM is artificially created by combining methylcyclohexane (sic) with methanol.

31. Two component parts of 4-MCHM are methylcyclohexane and methanol which are both known dangerous and toxic chemicals that can cause latent dread disease such as cancer.

Sure thing, guys, just l

From: [Ex. 6 - Personal Privacy] VVAWC/AWWSC

Sent: Friday, January 31, 2014 4:17:01 PM

To: [Ex. 6 - Personal Privacy] VVAWC/AWWSC; Arguto, William;

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Werner, Lora

Subject: Rescheduled: Conference Call -- PPh Discussion Group [Ex. 6 - Personal Privacy] (Feb 3 09:30 AM EST)

When: Monday, February 03, 2014 9:30 AM-10:30 AM.

Where:

Conference call Info:

Dial In #

Meeting ID

[Ex. 6 - Personal Privacy]

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Sure thing, guys, just like the two component parts of dogwood trees are dogs and wood. Chemically, this makes no sense whatsoever. Now, it's reasonable to ask if 4-MCHM can chemically degrade to methanol and 4-methylcyclohexane. Without going into too much detail, the answer is "No". You don't get to break carbon-carbon bonds that way, not without a lot of energy. If you ran the chemical (at high temperature) through some sort of catalytic cracking reactor at an oil refinery, you might be able to get something like that to happen (although I'd expect other things as well, probably all at the same time), but otherwise, no. For the same sorts of reasons, you're not going to be able to get formaldehyde out of this compound, either, not without similar conditions. Air and sunlight and water aren't going to do it, and if bacteria and fungi metabolize it, I'd expect things like (4-methylcyclohexane)carboxaldehyde and (4-methylcyclohexane)carboxylic acid, among others. I would not expect them to break off that single-carbon alcohol as formaldehyde.